THREE - AXIS ANTENNA POSITIONING SYSTEM   MODEL NO: JVM-APS-3D-002

1. Introduction and Features

Customized Three-Axis Antenna Positioner is designed to be used in a Anechoic Chamber for testing of payload from precise angles and height. The payload mounted on top of the positioner, it can be rotated almost one full circle to adjust horizontal direction and also can be tilted to set at an elevation angle. Salient features of the 3-Axis Antenna Positioner are summarized below:

- Low RCS Material to ensure almost no Electromagnetic Interference. Absorbers shall cover the metal portion.
- Three Axis (Azimuthal, Elevation, Polarization changer) movements
- Microcontroller based control sub-system
- Simple Push Buttons for Manual control of simple movements and adjustments
- RS-485 Modbus Interface for command and response from master controller (e.g., PC)
- Commands and Response through Modbus Registers to facilitate integration with other systems
- Windows based GUI to control the Positioner
- Capable of taking commands from a file for Automated Movements (Batch Processing)

2. Structural Design

Mechanical structure is made of metallic base which provides stability and housing of most of the electrical sub-assemblies. Most of the material used here is non-metallic. On top of the pylon a rotary platform is fixed with 360 degree freedom of movement. Angular position is determined with the help of an encoder. Payload support structure is situated on top of this platform with a movement to provide desired tilt along + and − from the horizontal axis for antenna measurements.

3. Drive Mechanism

Three Axis movement of the payload platform is achieved using precise stepper motors and gear mechanisms. Stepper motors are derived with microcontroller based control system and high power Switch Mode Power Supplies.

4. Features:

1. Three Axis Positioner System consists of following two parts:
    a. Central Dual Axis Positioner Az over EL
    b. Single Axis Polarization Positioner.
2. Both the Positioners are controlled by single controller to ensure synchronous operation.
3. It is possible to point to any direction in the chamber.
4. All metallic parts including motor and drivers are housed in base.
5. Pay load weight of up to 10Kg on EL over AZ and up to 5Kg on polarization.
6. Position accuracy of 0.1 degree.
7. Maximum speed 6 RPM for all axes
8. Positioner Controller based on 32 Bit ARM processor and supports multiple modes of operations.
9. Auto, Manual and Host Controlled operational mode.
10. RS-485 / Ethernet Ports for connectivity with Host Computer
11. Character LCD display for Controller Configuration and Monitoring.
12. Windows based GUI provided for host based controlling. Sample placed below:
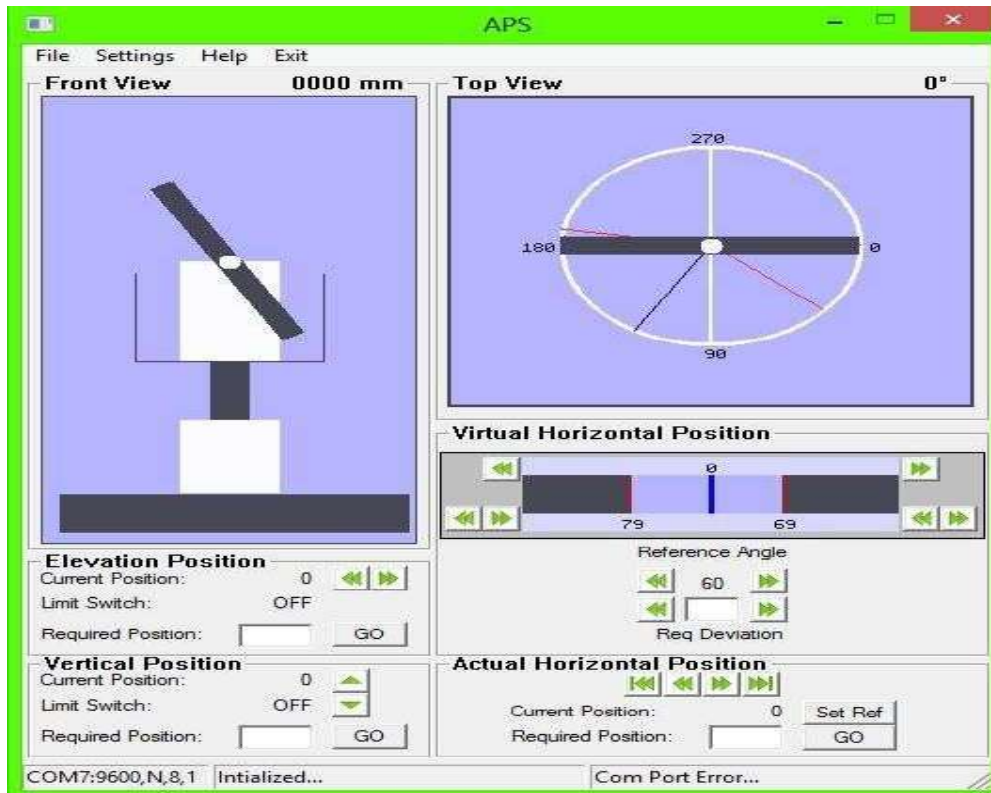
5. Rotary Joints

Rotary joints shall be mounted as per frequency requirement of its operation.(TBD).

6. PC Software

Windows based GUI program is provided to control and monitor the Three-Axis Antenna Positioner. With easy to use User Interface you can move the payload along any of the three axes as permitted by the hardware. Current position of the pay load is displayed in numeric as well as graphical representation for better visualization. Even when the payload is moved using manual buttons on the positioned the payload position is updated on your PC in real time. With help of mouse and keyboard you can also move the payload in any direction.

The software provided for actual and virtual coordinates with shifted origins for convenience. This way the zero of the coordinate system can be shifted according to the sensor/transmitter position and the angles are computed and displayed relative to the sensor.

PC software for the Three-Axis Antenna Positioner is generally customized to suit the application. Screen capture of one of the implementation is shown below.
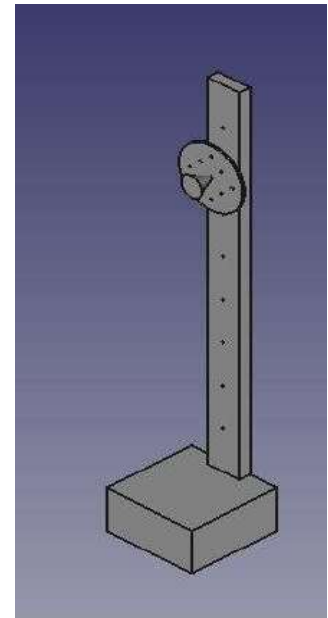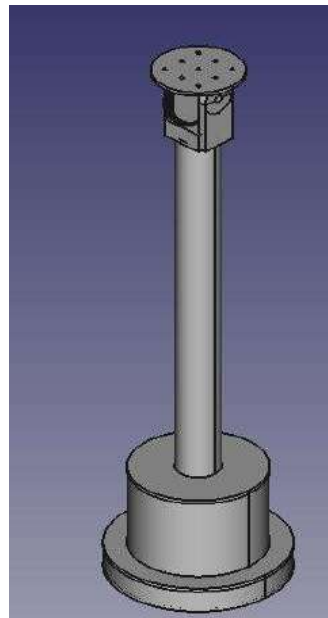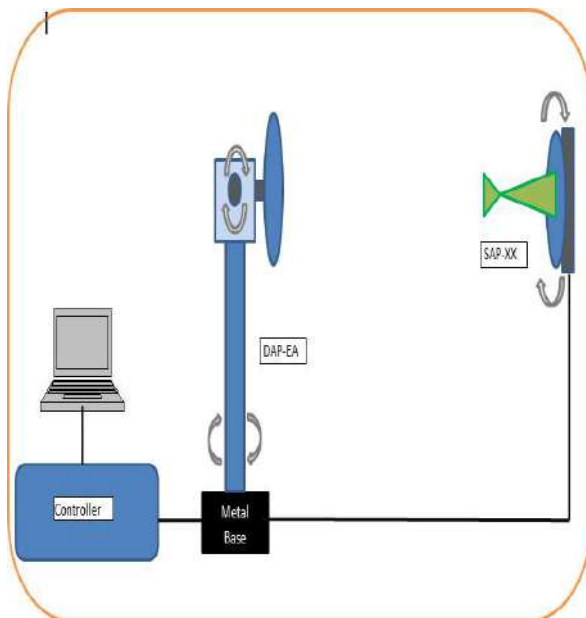
Antenna Measurement Software

- Software measures the AUT over multiple frequencies and displays the measured data in different formats
- Easy to use as it is easily manipulate, print or save the measurement result by the user.
- Versatility as our system can handle and analyze both simple polar plot or fully virtual simulator quickly and cost-effectively.
- Instrument compatibility: Our software supports many instruments from:
  - Anritsu
  - Keysight/Agilent/HP
  - Rohde & Schwarz
  - Brand as per customers choice.

Software Features:

- 3D/Spherical Plotting
- Basic 3D plots
- Reference antenna import feature
- Multiple S-parameters (S21, S11, etc.)
- Multiple trace plots
- Data Export/Import function
- Exportable vector plots
- Over frequency measurements
- Extensive plotting features
- Gain
- Antenna efficiency
- Axial Ratio
- And Many more
- Any customize data (To be ordered at the time of PO)